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used, — one that is durable, and not liable to get out of order; which will fix the objective firmly in position, and yet will permit it to be attached or removed with the least possible expenditure of time and energy. It must be admitted that the screw meets all these requirements except in the important matter of attaching and removing the objective. The screw is not an expeditious mode of attachment, although it may be improved by lessening the number of the threads so that only one or two turns of the objective tube would be needed in order to bring it to position. Most objects require to be studied under different amplifications, and the time spent in changing from one to another is a real loss. Most working microscopists will begrudge every second spent in changing, not only because their time is valuable, but also because an object may thus be lost, at least for a time, especially if it is a moving object. If it is possible, objectives should be attachable and removable without having to draw back the tube of the microscope or disturb the object. This is accomplished by the revolving nose-piece, but under the disadvantage of being somewhat bulky; also it answers for only two or three powers, and leaves the unused objectives exposed to the dust. The Facility nose-piece, the Zentmayer cut-away nose-piece, etc., show that objectives can be attached more quickly than by the ordinary screw; yet, like the screw, these devices require drawing back the tube in order to be attached. It will be a great gain if some way can be devised whereby each objective can be easily and instantly slid into place from the side, the new objective pushing out the one in former use as it is itself pushed in. This would probably involve a square or rectangular plate fixed to the top of the objective, sliding in ways fixed to the instrument tube, or some other equivalent arrangement. It is not, however, my present purpose to discuss the ways and means for gaining the important end of attaching the objective by some more speedy device than the screw, only to call attention to the subject. If no device superior to the screw can be found, by all means, let the fittest survive. On the other hand, it is neither mechanical, nor in the end economical, to let the screw, because it is already in the field, stand in the way of a better device. At the present time both microscopists and manufacturers are agreed on the society screw, and those who prefer nose-pieces have to go to the expense of providing adapters. It will be no more than fair to change the programme. Suppose we agree on some standard form and size of nose-piece, and let those who prefer screws provide the adapters.

By having the nose-piece attached directly to the objective tube, we would do away with screws entirely, also all need of adapters except to tubes already provided with screws.

It may be objected that there are so many possible ways of attaching objectives, that there is no probability of coming to an agreement upon a single standard size and form of attachment whereby the objectives of all makers could be used on every microscope, as they are under the present arrangement of the society screw.

In reply it may be said that we cannot know this until after the attempt has been made. If American microscopists take concerted action for making their needs known, it must result in a great many suggestions as to the proper mechanical devices for securing the desired ends. The resources of mechanics were not exhausted when the screw was invented. I believe it is only a question of time when the ordinary screw will be replaced by some more expeditious device, perhaps by some form of sliding collar, or, if the term be preferred, by the American nose-piece.

G. H. STONE.

Colorado Springs, Col., March 16.

Is the Rainfall increasing on the Plains?

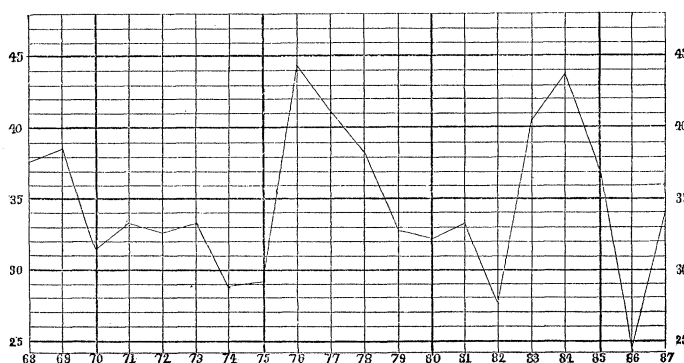
IN your issue of March 2, I observe the statement attributed to the chief signal officer, corroborating "the prevalent opinion that the rainfall in the West is increasing," while Mr. Henry Gannett "dismisses this popular idea as baseless." My own opinion is decidedly in favor of the affirmative of this question. My personal observations for twenty years at this point indicate the existence of a rainfall cycle of about seven years in duration, each septennial period including two or more consecutive years of precipitation above the average, and a similar series of years with precipitation

below the average. A seven-year cycle is also illustrated in the Fort Leavenworth rainfall, whose records cover double the period of my own observations at Lawrence. Recognizing the existence of this cycle, it will require a minimum series of fourteen years of records to warrant a division of the period into two equal parts for the purpose of determining the question of an increase of rainfall. I would therefore eliminate from Mr. Gannett's list all but nine of the twenty-six stations. At these stations the aggregate increase of precipitation in the second half of the periods of observation is 109 inches, which gives an average annual increase of 1.28 inches for the nine stations. This is certainly a decided increase, although the average period of observation is only nineteen years.

But the length of the period of observation at Fort Leavenworth is thirty-nine (instead of twenty-eight, as given in Mr. Gannett's table), — from 1836 to 1874. A study of this series of observation is of great interest, since it is the largest series in our possession, and especially since its division into two equal parts throws the first half entirely into the period preceding the settlement of Kansas, while the second half is placed entirely within the period of settlement of this great Commonwealth. The total precipitation in the first half of this period (ending June 30, 1855) was 592.84 inches, giving an annual average of 30.40 inches, while in the second half (ending Dec. 31, 1874) it was 696.29 inches, giving an annual average of 35.70 inches. This shows a total increase of 103.45 inches, or an average annual increase of 5.30 inches. This is assuredly a change worthy of notice, involving an increased precipitation of more than seventeen per cent.

My figures concerning the Fort Leavenworth rainfall are derived from a transcript of the records furnished by Prof. Joseph Henry of the Smithsonian Institution, and published in the 'Annual Report of the Kansas Board of Agriculture for the Year 1874.' In this transcript there are no records for 19 of the 468 months of the 39 years. Five of these blanks occur in the first half of the period, and have been filled by inserting the average precipitation for the months in question. Twelve of the blanks occur in the second half of the period, and have been filled by inserting the actual rainfall for those months at Lawrence, Manhattan, and Fort Riley, all of which stations are within about one hundred miles of Fort Leavenworth, and have a smaller rainfall than that of Fort Leavenworth.

The following diagram is appended as exhibiting more clearly this periodicity according to my observations at Lawrence: —



ANNUAL RAINFALL AT LAWRENCE, KAN., 1868-87.

A similar platting of the Fort Leavenworth rainfall exhibits six periods of excessive precipitation, separated by intervals of seven years, and alternating with periods of deficient precipitation, in the same manner as in the above diagram of the Lawrence rainfall.

F. H. SNOW.

Lawrence, Kan., March 13.

Bacteriology in our Medical Schools.

IN connection with the subject of bacteriology in the schools, it should be stated that Johns Hopkins University, though it has not yet established a medical course, has organized a pathological institute. In this institute the subject of bacteriology is thoroughly taught in the most approved manner by a competent board of instructors.

H. W. CONN.

Middletown, Conn., March 21.